

Digital Aerial Sketch Mapping

A Multipurpose Field Mapping Tool

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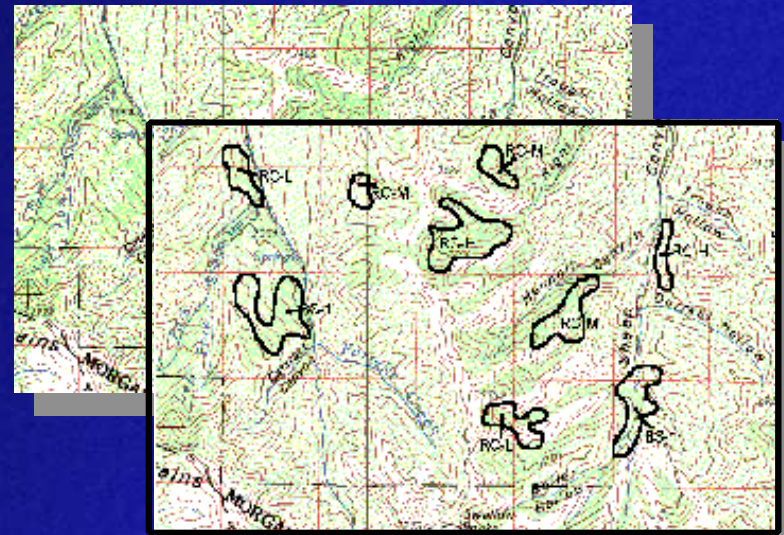
DASM Discussion Points

- What is sketchmapping?
- System nuts and bolts
- Benefits to PC based mapping
- Current use
- Emerging applications



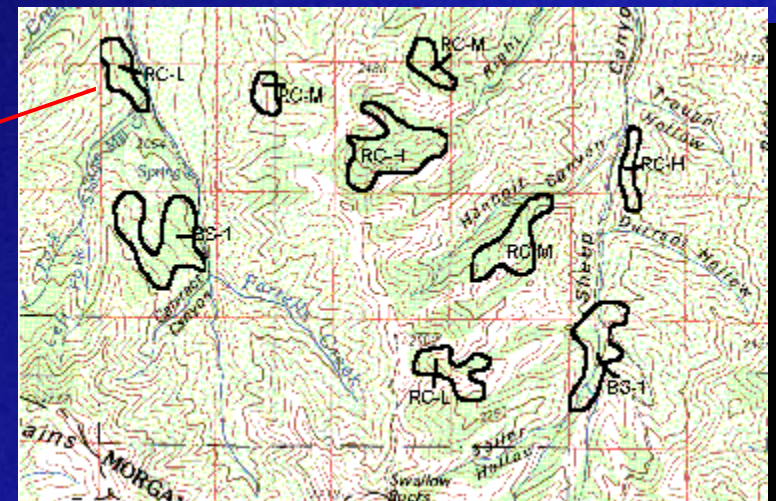
What is Aerial Sketch Mapping?

- “A remote sensing technique for observing forest change events from an aircraft and locating them on a map” (modified from McConnell, et al 2000)



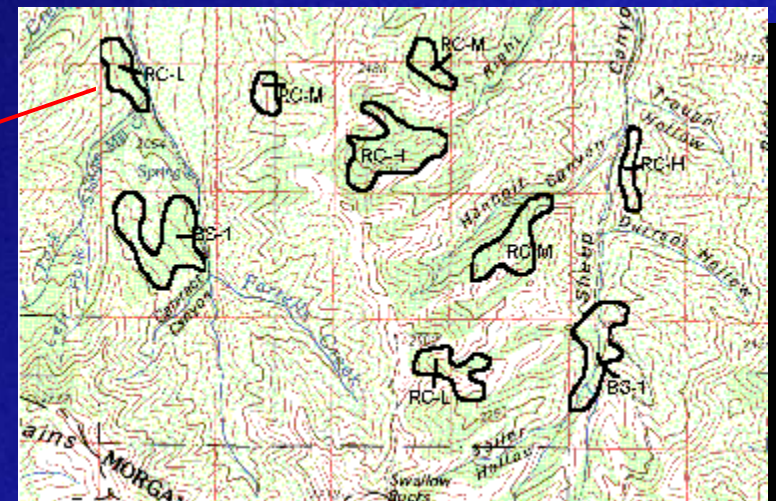
Why aerial sketchmapping?

- Forest health surveys are conducted annually over much of the U.S. by trained aerial observers to locate and map: insects, diseases, weather, fire, and other natural disturbances.



Pros and Cons of Aerial Surveying

- Pro: Aerial surveys are an accurate and cost effective means to cover large areas.
- Con: Traditional methods cumbersome and inefficient



DASM System Development

- RSAC began system development in 1996 looking for the most efficient way to use computers in aerial mapping surveys
- A 'wish list' of desirable system features evolved from a survey of the aerial sketchmapping community



The Wish List

1. A **touchscreen & stylus** for data entry
2. **Full color display** of raster and vector map data
3. A **live map display** linked to a GPS receiver
4. Display must be **sunlight readable**
5. **Direct transcription** of sketched features (points, lines and areas) into a GIS compatible data set



DASM Nuts & Bolts – 2 Screen

PC

Touch Screen



Two Screen System

GPS



DASM – Field Use



DASM Nuts & Bolts

All-In-One



DASM – Field Use

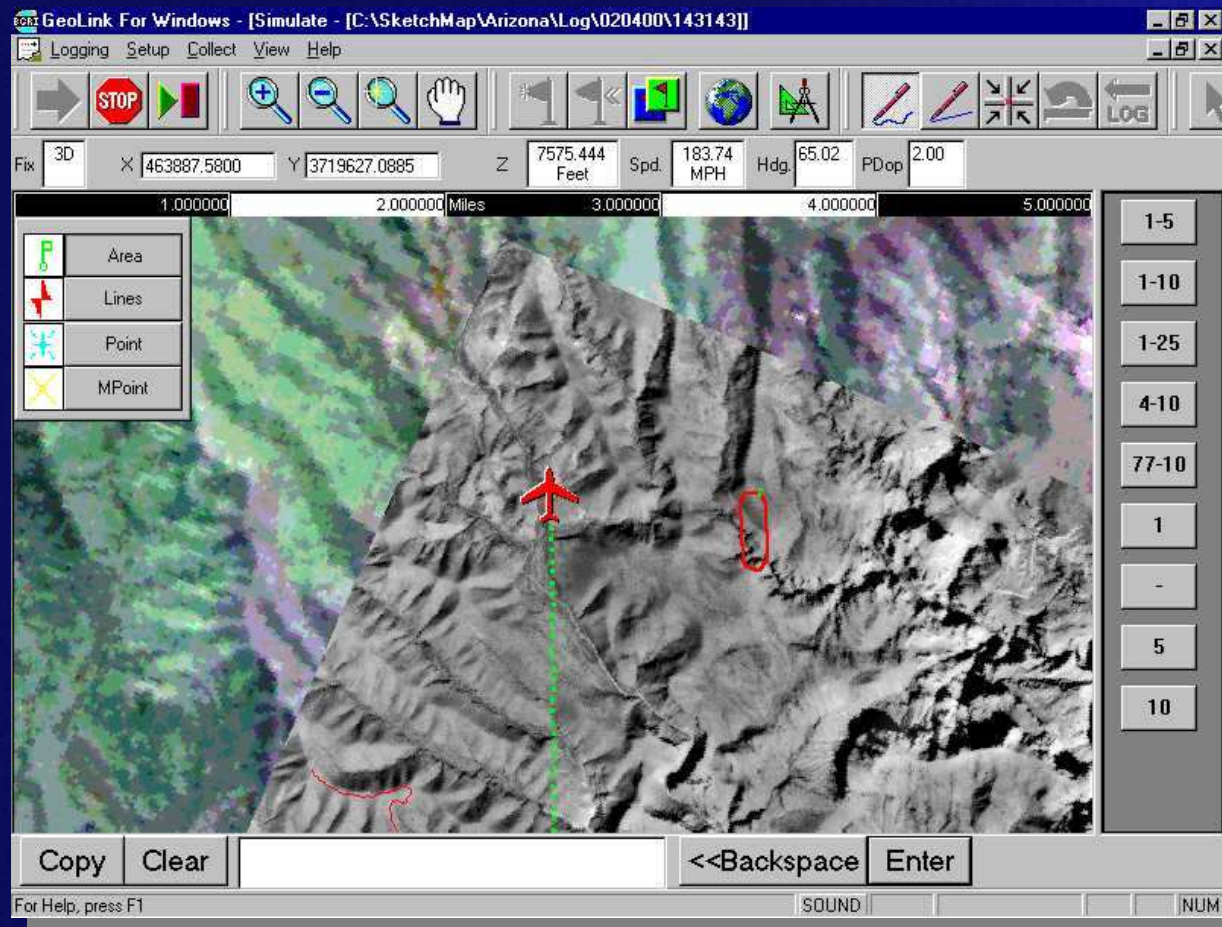


DASM – Field Use



DASM...The Software

Geolink by Michael Baker Jr. was chosen as the best software available.



DASM...The Software

- GeoLink software features:
 - Map **display of raster and vector** files
 - Attribution of data is done with **user-defined quick keys**
 - “**Heads-up**” **orientation** of map display
 - Output: ESRI **shapefiles**
- Periodic updates are made to the software based on user feedback.



DASM...GPS

GPS Requirements:

- NMEA 0183
- PC Connection
 - Serial Port
 - USB
 - Bluetooth
- External Antenna



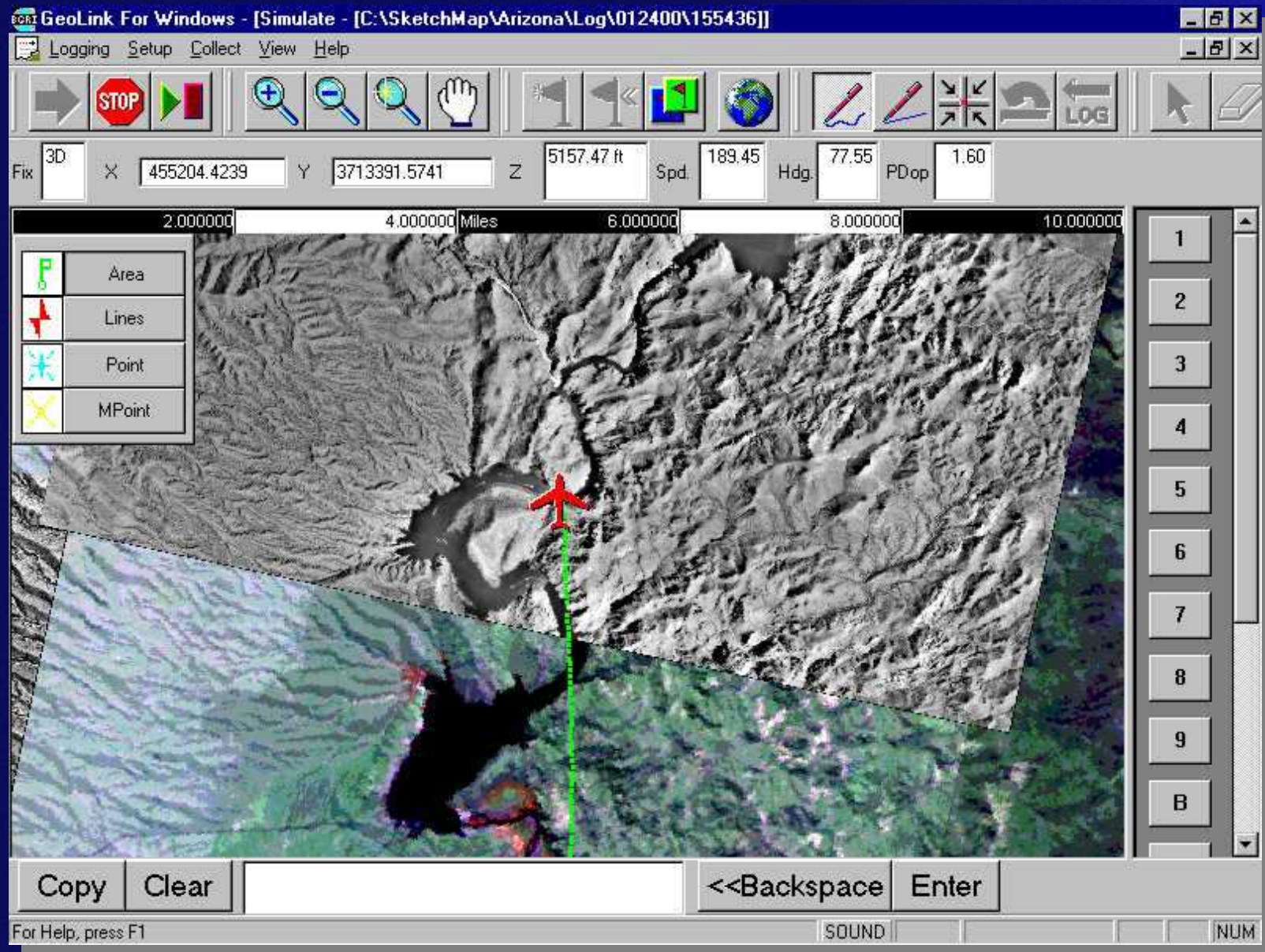
DASM - Background Maps

Options

- USGS Digital Raster Graphics (DRGs)
- Digital OrthoPhotos
- Satellite Imagery – Landsat, etc.
- Vector shapefiles
 - ◆ Roads, Streams, Contours, Administrative boundaries



DASM... Screen View



DASM...Post-processing

- Resolve overlapping polygons
- Combine shapefiles from multiple surveys
- Create a map of surveyed areas from flightlines
- Calculate acres for mapped polygons

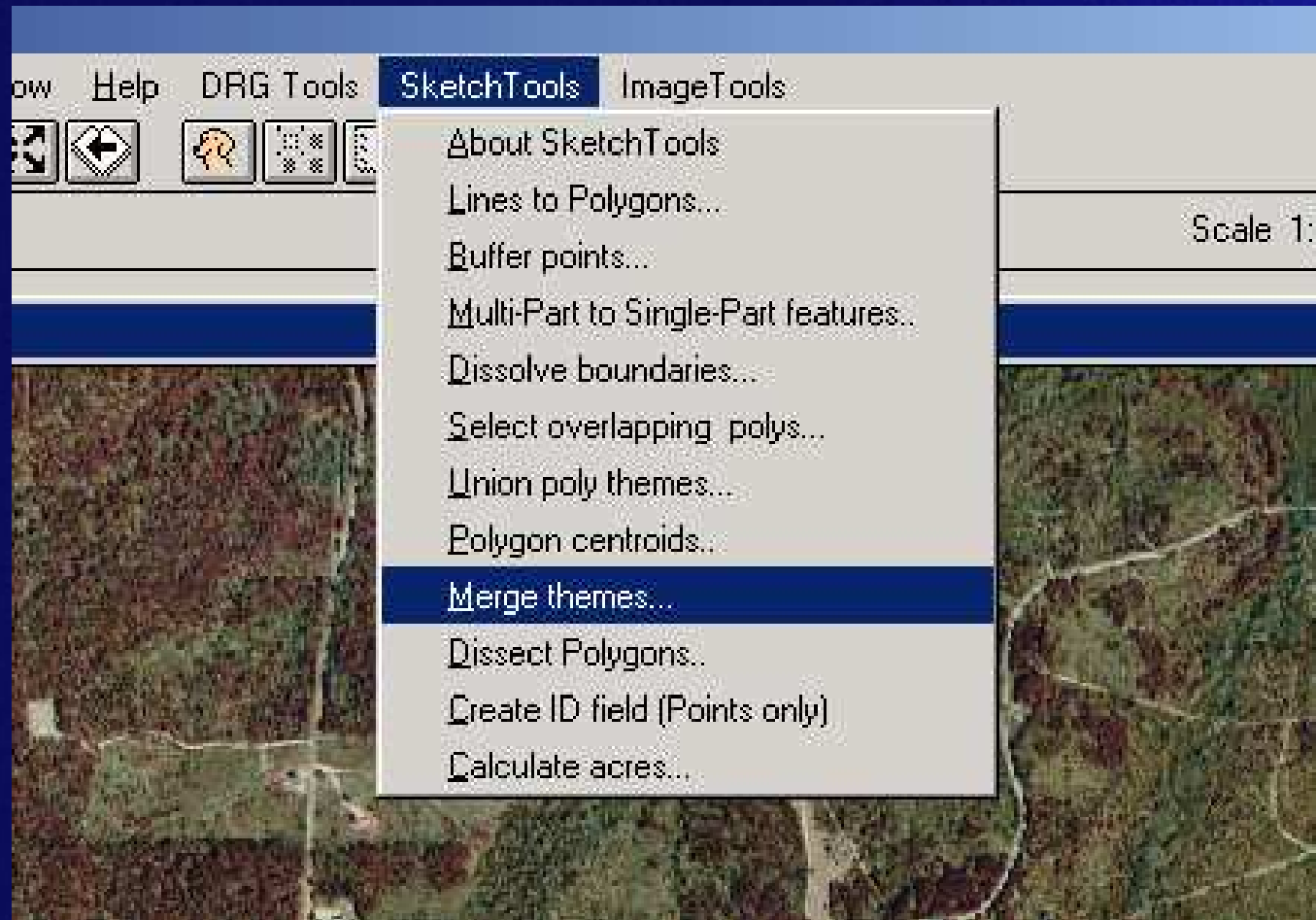
AND

- Output points of interest to GPS for field checks



DASM...SketchTools

SketchTools...an ArcView 3.x GIS extension



DASM...System Cost

2 Screen		All-in-one	
PC Laptop – 14.1” Dell Latitude C640	\$2300	Hammerhead 10.4” 800x600	\$5200
Touch screen – 12.1” KDS PB12MAPD	\$4320	Touch screen	n/a
GPS Receiver	\$305	GPS Receiver	\$580
GeoLink S/W	\$1346	GeoLink S/W	\$1346
Power Supply	\$100	Power Supply	n/a
Total	\$8371	Total	\$7126



DASM Benefits to Aerial Surveys

DASM Provides:

- ◆ Improved positional accuracy of sketched features
- ◆ Decreased time spent sketching features
- ◆ Improved uniformity of data attribution
- ◆ Reduced use of cumbersome maps in cockpit
- ◆ Elimination of office digitizing (from paper maps)

Improved overall efficiency!!



DASM...Other Applications

- Emerging Uses

- ◆ Training site verification/accuracy assessment for remote sensing classification projects
- ◆ Mapping of invasive weeds: Everglades National Park has flown many hours with the system in a helicopter. Hell's Canyon weeds survey (Star Thistle).
- ◆ Wildlife habitat mapping: Moose surveys in Yakutat
- ◆ Post-fire ground survey (BAER mapping)



DASM...Other Applications

FIRE!!

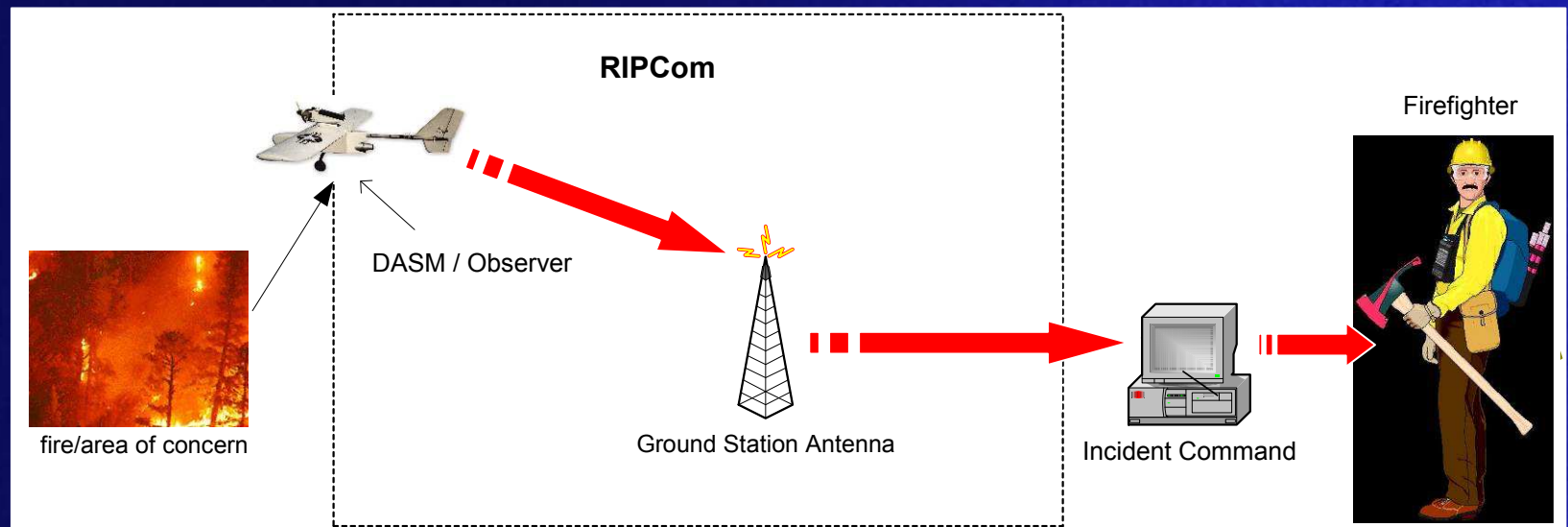
- Mapping fire perimeters, hotspots, control lines, structures, access routes
- Requires real-time downlinking for best benefit



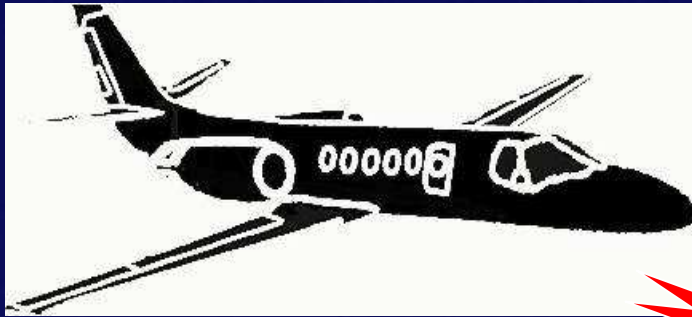
Remote Internet Protocol Comm. System

RipCOM

- Developed by NASA Goddard Space Flight Center
- Can be used with a computer network or a single lap top.
- 2.4 MHz system utilizes 1 watt amplifiers. We are seeking FCC authorization to use 5 watt amplifiers.



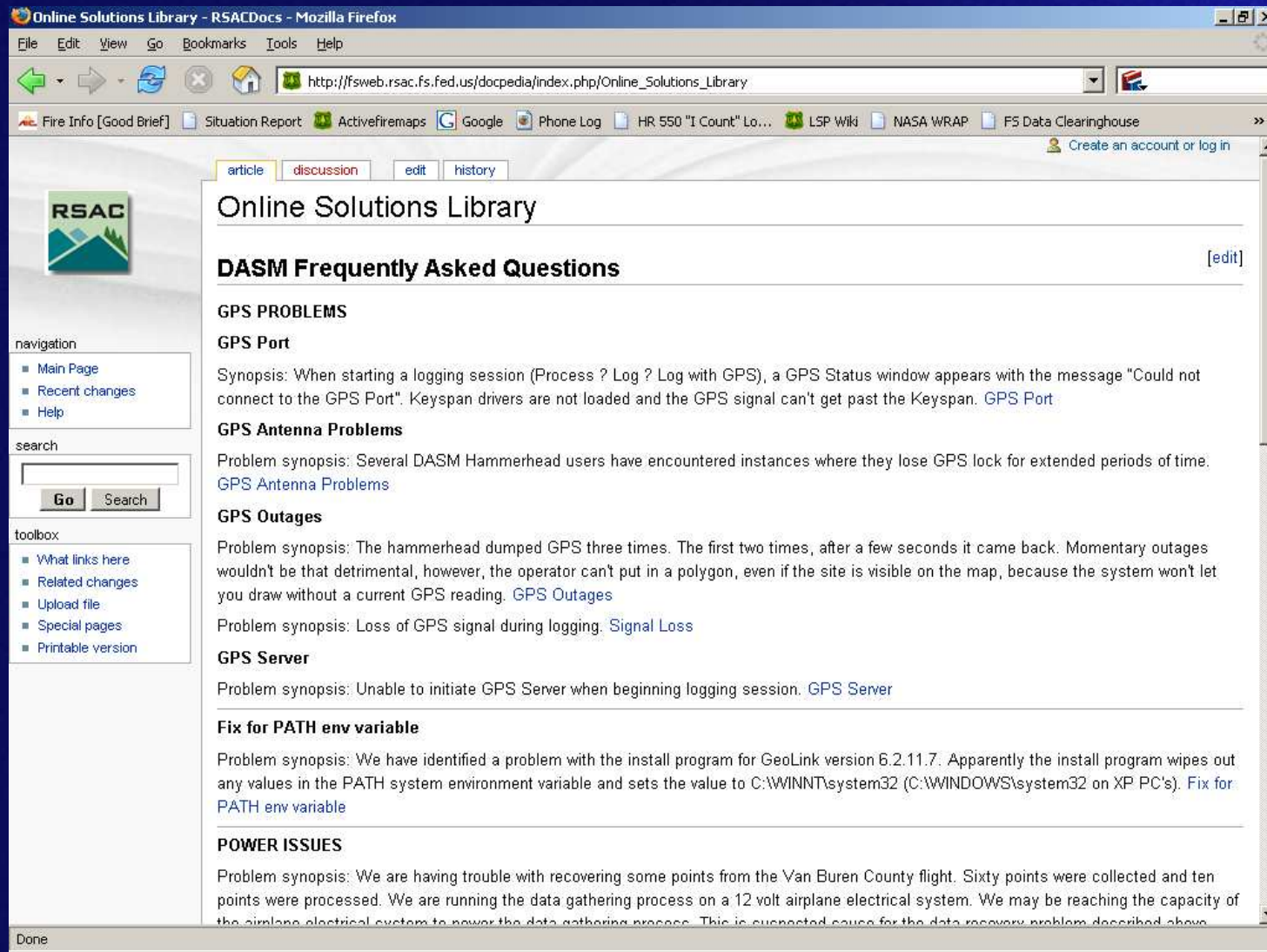
RipCOM to Ground Station



- Aircraft transmits collected data back to incident command
- Data consists of perimeters and hotspots



Training / User Support



The screenshot shows a Mozilla Firefox browser window titled "Online Solutions Library - RSACDocs". The address bar displays the URL http://fsweb.rsac.fs.fed.us/docpedia/index.php/Online_Solutions_Library. The browser's menu bar includes File, Edit, View, Go, Bookmarks, Tools, and Help. The toolbar contains navigation icons and a search bar. The page content is organized into a sidebar and a main article area. The sidebar on the left includes the RSAC logo, a navigation menu with links to Main Page, Recent changes, and Help, a search box with Go and Search buttons, and a toolbox with links to What links here, Related changes, Upload file, Special pages, and Printable version. The main article area is titled "Online Solutions Library" and features a sub-header "DASM Frequently Asked Questions" with an [edit] link. Below this, the article is divided into sections: "GPS PROBLEMS", "GPS Port", "GPS Antenna Problems", "GPS Outages", "GPS Server", "Fix for PATH env variable", and "POWER ISSUES". Each section contains a "Problem synopsis" and a link to a more detailed article. The status bar at the bottom of the browser window shows "Done".

Online Solutions Library - RSACDocs - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://fsweb.rsac.fs.fed.us/docpedia/index.php/Online_Solutions_Library

Fire Info [Good Brief] Situation Report Activefiremaps Google Phone Log HR 550 "I Count" Lo... LSP Wiki NASA WRAP FS Data Clearinghouse

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Online Solutions Library

DASM Frequently Asked Questions [edit]

GPS PROBLEMS

GPS Port

Synopsis: When starting a logging session (Process ? Log ? Log with GPS), a GPS Status window appears with the message "Could not connect to the GPS Port". Keyspan drivers are not loaded and the GPS signal can't get past the Keyspan. [GPS Port](#)

GPS Antenna Problems

Problem synopsis: Several DASM Hammerhead users have encountered instances where they lose GPS lock for extended periods of time. [GPS Antenna Problems](#)

GPS Outages

Problem synopsis: The Hammerhead dumped GPS three times. The first two times, after a few seconds it came back. Momentary outages wouldn't be that detrimental, however, the operator can't put in a polygon, even if the site is visible on the map, because the system won't let you draw without a current GPS reading. [GPS Outages](#)

Problem synopsis: Loss of GPS signal during logging. [Signal Loss](#)

GPS Server

Problem synopsis: Unable to initiate GPS Server when beginning logging session. [GPS Server](#)

Fix for PATH env variable

Problem synopsis: We have identified a problem with the install program for GeoLink version 6.2.11.7. Apparently the install program wipes out any values in the PATH system environment variable and sets the value to C:\WINNT\system32 (C:\WINDOWS\system32 on XP PC's). [Fix for PATH env variable](#)

POWER ISSUES

Problem synopsis: We are having trouble with recovering some points from the Van Buren County flight. Sixty points were collected and ten points were processed. We are running the data gathering process on a 12 volt airplane electrical system. We may be reaching the capacity of the airplane electrical system to power the data gathering process. This is suspected cause for the data recovery problem described above.



http://fsweb.rsac.fs.fed.us/docpedia/index.php/Online_Solutions_Library

Digital Aerial SketchMapping...

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